TOWNSHIP OF CHATHAM
ZONING BOARD OF ADJUSTMENT

IN THE MATTER OF:
CASE NO. BOA 15-83-3,
NEW YORK SMSA, LIMITED,
VERIZON WIRELESS
BLOCK: 83, LOT: 3

TRANSCRIPT
OF
PROCEEDINGS

Wednesday, February 10, 2016
Municipal Building
54 Fairmount Avenue
Chatham, New Jersey 07928
Commencing at 7:40 p.m.

BOARD MEMBERS PRESENT:

TONY VIVONA, Chairman
MICHAEL HYLAND
GERGORY BORSINGER
JON WESTON
WILLIAM STYPLE
TINA ROMANO
RICK WILLIAMS

ALSO PRESENT:

KALI TSIMBOUKIS, Secretary
ROBERT A. MICHAELS, Planner
JOHN K. RUSCHKE, P.E.
MR. DOTTI, P.E., P.P., INCE
BRUCE EISENSTEIN, Ph.D., P.E.

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Counsel for the Applicant

I N D E X

EXHIBITS MARKED INTO EVIDENCE

CHAIRMAN VIVONA: I want to go over a couple of ground rules. We will try to get through as many witnesses as possible and then you will have an opportunity to ask questions of the testimony. It's questions only. When we are done with all of our witnesses, you may make statements.

No signs are permitted in this room. If you want to protest, you can outside or on Pine Street but we don't allow posters and signs inside here. It's distracting and we will do our best to hear everything out and make a decision upon our findings but the posters are not allowed so let us begin.

MR. HYLAND: Did you get this letter?

MR. SHAW: Yes. You are not allowed to consider it or things which are distributed. You are not allowed to consider letters but any person who sent such a letter should attend and state what their opinion is on the record.

MR. HYLAND: Was there a letter about Buxton?

MR. SHAW: No.

MR. FERRARO: Was there a letter mailed to the Board? I would like to know what the Board has.

CHAIRMAN VIVONA: A letter from the community.

MR. FERRARO: Were those mailed in through the Board secretary or to the Board members directly?

CHAIRMAN VIVONA: They were mailed to the municipal building.

MR. FERRARO: Okay. If that letter was mailed and dated to the Board, did we mark it as an exhibit?

MR. SHAW: I haven't seen this.

MR. HYLAND: It says "Mr. Michael Hyland, Township of Chatham."

MR. SHAW: Counsel, you should have a copy. It's been addressed to various Board members.

I would just note that the Board cannot receive any testimony in the form of letters or petitions. It can be received but it will not be evidential because we don't have the ability to cross-examine the members who signed it.

MS. TSIMBOUKIS: That came in the envelope addressed to us.

MR. SHAW: It should be marked as an exhibit but it should be received but it cannot be considered as evidence by the Board because it's a

letter.

MR. HYLAND: But we all have the same one.

MR. SHAW: It's like un-ringing a bell.

MR. HYLAND: That's why I asked.

(Exhibit O-1, letter, was marked for Identification.)

MR. FERRARO: Frank Ferraro, attorney on behalf of the applicant, Verizon Wireless. Thank you for scheduling this special meeting to consider this application.

We were here last time back in December where we gave the Board a brief overview of what we are proposing in this application. Verizon is seeking to utilize one of the existing PSE&G electric transmission towers at Block 83, Lot 3, within the 225-foot-wide PSE&G right of way that runs through the Township of Chatham in the R3 residential zone.

MR. SHAW: We did do a site inspection. One of the first things we do is have the author read it into the record.

MR. FERRARO: Sure.

MR. SHAW: This is A-12.

(Exhibit A-12, site inspection report, was marked for Identification.)

MR. BORSINGER: "This is the Town of Chatham Zoning Board of Adjustment site visit. Board members -- BOA 15-83-3, Block 83, Lot 3. Board members present: Mr. Styple, Mr. Borsinger, Mr. Shaw, Mr. Hyland.

Applicants present: None.

Neighbors present: Peggy Herr, 53 Pine Street; Joe Baron, 28 Maple Street; Rose Denaro, 24 Maple Street; Bob Bolder, 16 Pine Street, Heather Hurting, 82 Pine; David McNeil, 79 Pine Street; Bob Priscilla, 28 Pine; Isabella Taylor, 49 Pine and Dingmin Chang, 44 Pine Street.

On Saturday, January 9, 2016 at 9:00 a.m., the above members of the Township of Chatham Board of Adjustment and other interested parties visited the lot area of Pine Street.

The applicant is seeking the following variances: Use variance for the installation of a cellular telecommunications tower in the R3 residential district; Number 2, maximum allowable height, D variance; structure accessory to other use than residential for purposes of extension of existing power tower for construction of a wireless

communication tower attached to the top of the tower. Maximum height, 35 feet is allowed and 132 and a half feet existing to the top of the tower and approximately 140 and a half feet is proposed, which is the top of the antenna, Section 30-75.2, Bisection 30-96.13.B. Number 4, maximum height of fence around the equipment shelter, 6 feet allowed, 7 feet proposed, Section 30- 96.15.R1A.

The following comments and observations were made during the visit: The Board noted a staked out area of Pine Street underneath the existing power tower lines that was free from trees and shrubs. The area was staked out with pink ribbons and blue for the shelter and yellow for the fence boundaries. The delineation of road, fence and structure appeared to coincide with applicant's site plan Sheet Z1.

Submitted by: Gregory Borsinger."

MR. FERRARO: Verizon Wireless is seeking to utilize an existing PSE&G electronic transmission tower within this particular Metuchen-Chatham -- Roseland-Metuchen right of way. The existing tower is 132 feet tall to the top of the tower. Verizon Wireless is proposing to install an 8 foot extension and to install 12 antennas on

the square platform on that particular transmission tower. So the total height of the facility would be 140 and a half feet.

In addition, as shown on the site plans and as marked out during the site visit, Verizon is proposing a fenced-in equipment area directly behind the public transmission tower for its equipment and also a new gravel access drive.

We have four witnesses for you tonight, if we get to all of them. We have our radio frequency engineer to review the need for this particular site at that particular location. We have our professional engineer that you heard from last time that will review the existing design as shown on the plan and will also have some alternative design options that we can share with the Board based upon the feedback we got when we were before you. We have our EMF expert to review the FCC emission compliance of the facility, demonstrating that it would operate well within all FCC requirements and standards for radio frequency emissions, and, finally, a professional planner is here to review photo simulations with you as well as the statutory criteria for the granting of the relief requested.

In this particular application, we are requesting a D1 use variance since telecommunications facilities are not permitted in the R3 zone. They are only conditionally permitted in the AH zone and municipal property and the P1 zone.

We do have a height variance. 35 feet is the maximum building height in the R3 zone. The existing tower is 132 and a half feet tall and what we are proposing is 8 feet above that at 140 and a half feet.

We are requesting a fence height variance; 6 feet is permitted in the R3 zone. There's a 7-foot composite stockade fence being proposed around the equipment cabinets near the base of the pole.

There is another variance that's noted in the Board professional's report as well as in A-12, the site inspection report, with respect to the height of the panel antenna. The maximum allowed is 6.0 feet proposed. The applicant has not noted that variance in the application because that provision shows up in Section 30-99.9 of the township code pertaining to conditionally permitted locations, of which this is not. Regardless of that, if the Board decided it was required, it would

be a bulk variance and would be subsumed under the use variance relief.

This is a D1 use variance application. We requested preliminary and final site plan approval with certain detail waivers that were outlined in the application.

So, Mr. Chairman, unless there's any initial questions, we would call our first witness, Glenn Pierson, our radio frequency engineer.

CHAIRMAN VIVONA: Any questions for Mr. Ferraro?

DR. EISENSTEIN: You should swear me in so I can question the witness or answer questions of the Board.

CHAIRMAN VIVONA: Okay.

B R U C E E I S E N S T E I N, P h D., first having been duly sworn, testified as follows:

DR. EISENSTEIN: My name is Bruce Eisenstein. I'm a consultant to the Board for radio frequency and telecommunication issues. Should I go through my qualifications?

MR. SHAW: The public might be interested.

DR. EISENSTEIN: I have a Bachelor's of Science degree from MIT and a Master's of Science

from Drexel and a Ph.D. from the University of Pennsylvania in electrical engineering. I'm a registered professional engineer in the Commonwealth of Pennsylvania.

For the last 22 years, I have been doing this kind of consultation work entirely for municipalities. I serve as an expert witness for the municipality and advise Boards in this. I have made about 400 appearances in the State of New Jersey by representing over 100 municipalities. I'll stop there.

MR. SHAW: The Board has retained you on an annual basis as its electronic engineer?

DR. EISENSTEIN: I have appeared before this Board numerous times.

G L E N N P I E R S O N, 63 Beaver Brook Road, Suite 201, Lincoln Park, New Jersey 07035, first having been duly sworn, testified as follows:

MR. PIERSON: I have a Bachelor's of Science in electric engineering from NJIT. I have 30 years experience designing radio systems, 6 with Motorola and 3 with a consulting company working on T- Mobile systems and Verizon when they were Bell Atlantic Mobile and the last 17 as a principal of PierCon Solutions. I have been accepted by this

Board, probably about 15 years ago, and as an expert in hundreds of Boards in New Jersey and Superior Court in Essex and Bergen County.

CHAIRMAN VIVONA: Thank you.

DIRECT EXAMINATION BY MR. FERRARO:

Q. Your area of expertise is radio frequency emissions, correct?

A. Radio frequency engineering for this particular situation.

Q. And have you done a radio frequency analysis of the plan site in this application?

A. Yes.

Q. Verizon is an FCC-licensed provider of telecommunication services; is that correct?

A. Yes. They have licenses in four different frequency bands. The first frequency band is the cellular band. That's where, if you use a Verizon phone, if you make a voice call, that's where it would be handled and that's at 850 megahertz. The frequencies will matter as we get further on.

The next license is the 1900, the higher frequency. It doesn't cover as far and isn't as friendly with trees and hills so you will have a reduced amount of coverage as compared to the

cellular band. That's normally used today for data.

The next license that was obtained for Verizon Wireless was the 2100 megahertz land that's, again, just envelopes the 1900 because there's two pieces to it and that's also used for data at this point. Those higher-band frequencies, like the 1900, came when Sprint and T-Mobile came into the mix in the mid-'90s. Then the latest frequency bands that Verizon obtained was the 700 megahertz. That's your 4G data LTE as advertised on television. That is handling all the broadband data at 700 megahertz. It has a similar coverage pattern to the original cellular frequencies but there are some concerns with that frequency band at this point, which is partially why we are here tonight.

Q. And based upon your analysis, have you concluded that Verizon has a gap in its existing reliable coverage in this area?

A. There's two. They have a gap in coverage or service in those higher frequency bands since they do not cover as far. The coverage from the lower bands, the 800 and the 700 bands, are better. It's not necessarily a blanket. If you use it in the area of Pine Street, sometimes you will have coverage. Some people will have coverage,

especially the higher elevation. In certain areas, you will have some trouble.

The coverage analysis is based on Verizon's higher frequency bands. They have twice as much spectrum as they do in the lower. When you are doing a design, they need to design for their worst- case frequency band. They have an FCC license in those bands so they have a right to design to those higher frequency bands.

The second gap they have is more of a capacity gap in the data network. We will have something showing that. The 700 megahertz LTE data network is reaching capacity in some of the surrounding sites and Verizon needs to do something in order to maintain the greatest service to the customer for the broadband data.

Q. With respect to this type of technology, Verizon is proposing an antenna height of 140 and a half feet. Do you believe that's the minimum height necessary in order to address these coverage deficiencies?

A. It is the minimum height. There is a little bit of room. You can move back and forth up above the tree line. The top of the antenna is 140. I go by a centerline of 137 from a radio

perspective. Within a few feet, I would say that would be the height that is required. As you will see when we get into the coverage, there are areas that we don't quite cover and indicates that you could use a little more height but it's not necessarily practical in this situation. We are getting as much as we can out of the existing structure that exists.

Q. Before we dive into the propagation map and the empirical data, does Verizon attempt to use existing structures where possible?

A. Yes.

Q. Why is that?

A. Most of the ordinances of all towns are looking for less new towers and to use an existing structure instead of building a new one. So Verizon Wireless has embraced that philosophy. That is why every time an RF engineer goes out and designs parts of the system for a particular site, you are looking for existing structures to try to work with those as best we can.

Q. Now, as you stated, you prepared exhibits to demonstrate to the Board and public the need for this particular site?

A. Yes.

(Exhibits A-13, A-14 and A-15 were marked for Identification.)

Q. Mr. Pierson, before you start, Exhibits A-13 and 14 and 15 were prepared by you or under your supervision?

A. By me.

Q. Which exhibit are you starting with?

A. A-15. All my testimony will be using A-15, the base map and the overlays.

A-15, as I said, is USGS topo map with 1 inch equals 800 feet. The map shows streets and terrain and lines that tell you what the average terrain level is to the average sea level.

Just to give you an idea where we are, Route 124 runs from the top left and comes down. The Great Swamp is over on the lower left portion of the exhibit. The right of way is the two lines, dotted lines that run from Chatham Borough down and to Shunpike, which runs east-west towards the middle of the exhibit. We cross under a blue dot that we placed, which is the proposed site, and the right of way and the PSE&G towers continue south towards the Municipal Building, where we are today, and it cuts off and goes up the hill.

I have placed several dots on the map.

The green dots represent Verizon's on-air facilities. The blue dot is the proposed site. The yellow dot is labeled "Future Site" which would be a future site possibly.

Going around clockwise, in the upper left-hand corner, we have Madison 2. That's a monopole that Verizon is collocated on that is next to a little power station off of -- I don't remember exactly. It's 114 Kings Road and there's multiple carriers on the monopole; I think it's 150 feet tall and Florham Park 2 is a facility on an electrical transmission tower on the same right of way. We have Chatham Downtown, a little small cell on the face of one of the buildings in Chatham Borough. It's designed to cover in-building coverage along by the train station and the downtown area. We have the Watchung Avenue AT&T electronic transmission tower, another collocation on a transmission tower. It's right on the border right by the river, just south of it.

If you go further to the south, we have Summit 4. That's a new build that's on municipal property. Verizon wants to erect a new pole on this property. You come around to the bottom, New Providence 2; that's in Chatham.

Some of the names, when an original project is created by Verizon, you have an idea of what town you think it's going to be in but by the time you find a candidate, it may switch over the border. This is the same electronic transmission tower that the AT&T tower is, just further south. That's off of River Road. That installation is somewhat similar to what we are proposing here. The antennas are mounted above the tower. You can see those above River Road if you look -- actually, you have to cross over the bridge and if you look down the right of way, you can see it from there.

Then we have Chatham, in the left-hand side, at the police station, DPW, the lattice tower that Verizon is collocated on and I think that's one of the sites that is listed in the ordinance as a preference and we are there providing coverage from that location. That's been on the air for many years.

What we have is similar to A-13. The first overlay is the reliable suburban coverage. This is coverage to inside a wood-framed structure for a suburban area. For the most part, that would be the design criteria for Verizon. This overlay shows a green tint. That green tint is areas that

meet the design criteria for suburban coverage for the higher frequency. We did that for the data network because we are running data in that higher frequency band. What this shows is there is coverage around the existing sites.

We have a ridge that runs along Fairmont that separates New Providence and Summit from Chatham. As you see, the coverage stopped over that ridge because the sites are down lower and the east side of that ridge, the sites to the north, Madison and Florham Park, they are down in the lower elevation. As well as, you come south from Florham Park and Madison, you have another ridge. So you have a "T," an arrow, you have a ridge that runs east-west from the upper left- hand corner and comes down towards the subject site and continues onto Fairmont Avenue and then there's another part of the ridge that goes to the southwest. That defines where radio waves are going to cover in this particular area.

The particular objective for this project, Chatham 4, on the existing electronic transmission tower off of Pine Street is Shunpike Road, Watchung Avenue to Fairmont. So that's going to be the main roads that run east-west that you are

familiar with. We have Lafayette Avenue going south past the high school. That goes all the way into the borough on 124 and weaves down and comes down to Southern Boulevard. We have Maple Street, Spring Street and Pine Street and Rose Terrace on the other side of Shunpike. So a little bit to the right of the right of way, that goes north and up and towards the borough. We have Noe Avenue to the west and by the cemetery and Shunpike Road. We have Southern Boulevard, which is not necessarily an objective for this particular site. We do have "Future" there but this is, as I said, just defining more of the areas that have a coverage issue and then, from a major standpoint, we have Lafayette Avenue.

In the goals for this particular project, if we look at the 2010 census and select the area of the gap that this project is supposed to cover, because we have a two-site solution here because of the ridge that we are on, it divides the southern half. There are 3,472 "pops," as you say, from the 2010 census in the coverage objective area for Chatham 4 that this site is going to provide additional service to and then you have about 1100 students and faculty in the high school. So that gives you an idea of the magnitude of the people

that this is going to improve Verizon for.

Q. With respect to how this Exhibit A-15 was created, the green area shown as existing coverage, did you use a propagation tool to create that?

A. Yes. This is based upon Verizon's propagation tool and we have some drive test data that we did in order to make sure everything matches up and is accurate.

Q. Is this kind of computer modeling standard in the wireless industry?

A. Yes.

Q. Have you found it to be accurate in your experience?

A. Yes. Just to make sure, we double-check, use data and use empirical data, and make sure it matches the propagation tool to double-check it.

Q. In your opinion, does the first overlay of A-15 depict a significant gap in Verizon's reliable coverage?

A. Yes.

Q. You have another exhibit of the coverage to be gained if the site were to be approved?

A. Yes. The coverage we expect out of this site, this has been designed based on a two-site solution. What we have is antennas that are pointed northeast at 50 degrees going up towards Chatham Borough and we have antennas at 140 degrees to the southeast towards the high school and 20 Fairmont and then we have another sector pointing about 320 degrees towards Madison and up Woodland Avenue.

The idea is: This site, since it's on the top of the hill slightly on the north side, it can do a better job of covering north and then we can use another transmission tower to try to cover the low area to the south. If we move further north, we come down the hill and then that would reduce coverage on the top of the ridge and send you down the hill a little bit. If we go to the south, you will lose the coverage to the north and we wouldn't be able to see over the hill and back down the tracks.

So we are balancing on that hill and the terrain and the hills are deciding what the network looks like in order to provide reliable coverage. So we are trying to balance that hill. This one will be near the top and, hopefully, in the

future, we can work on the tower to the south. I think that was possibly filed with the Board once upon a time but they are working on some other issues to work out the design to move that one forward. I'm sure there are some other engineering items that have to be addressed before we can come here and present that.

Out of the gap areas that we talked about, the proposed site is covering approximately half of Shunpike/Watchung Avenue, the objective. We have almost all of Lafayette Avenue. We lose the southern end because it's going downhill. We have all of Maple Street. We are not touching Pine Street down by the pool area. There's Spring Street and School Street so we miss that. It's down the hill and on the backside where we are not pointing any antennas at this point in time. We have all of Rose Terrace and, on the east side of the right of way, Noe Avenue.

To the west, we are getting a significant amount of that between Woodland and Shunpike. We are getting a portion of Woodland but as I said, we are not getting Southern Boulevard to the south. We are getting the school and the school is important because high school students use a lot

of data and, usually, the sites that Verizon has are near schools. You see a significant amount of usage and plans have to be put in place to try to offload that usage in order to maintain greater service. So this is key. We have an antenna pointing right at that to the southeast in order to provide the in-building coverage to those thousand or so students.

That pretty much details what we're doing from a coverage perspective. As I said, they are clear areas on this map on the handouts that you have. We will have somewhat better coverage than what is shown on these exhibits. If you make a phone call, because it's a different frequency, it's a lower frequency, it travels further. If you are trying to use the data, you are going to get coverage similar to what we show here at higher frequencies or if you are trying to use it during business times when there are capacity issues and we will go into capacity.

Q. A few things with respect to the second overlay of A-15. This particular exhibit was created in the same fashion as the previous overlay, correct?

A. Yes.

Q. Is this exhibit showing the coverage to be gained at the proposed antenna center line of 137 feet?

A. Yes.

Q. Is that, in your opinion, the minimum height necessary to cover this area of deficient coverage?

A. Yes. As you can see, we are a little shy to the north of Woodland Avenue. Probably in a couple little areas, we have a terrain drop off towards Watchung Avenue and there's not much point of pointing that antenna there. It's more important to point it towards the school. That's in the borough as well. It's not in the township. So something in the borough will be needed to cover that section between Chatham Downtown down to Watchung Avenue. The ground elevation drops to 300 feet and we are at 360 so the signal just flies right over it instead of trying to hug the ground.

If you are up here on Pine Street and you look north, you can see buildings that appear, to me, to be near Livingston Mall. I was trying to pinpoint where they were. I found it a little difficult to try to pinpoint but it has a very long view going north. You cannot see everything in the

valley but you see the next set of hills going north, which is sometimes a bad thing.

So what has to happen, these antennas we put up, we will have to just angle them slightly down going north so that the signal doesn't fly off into another area and show up on the other side of Route 24 and cause interference. So there's a balance based upon that. We are on a hill here, 360 feet, and the area in the train tracks is at 220 feet of ground elevation and then goes down and comes back up. So there's a balance of what you need to cover and what you don't want to interfere with. If you are coming down Fairmont Avenue and you look to the left, you see that whole valley. That would be bad for a cell site because it would just -- there's too many people for one site to cover. You would have overload. There's a lot of sites down there. You are going to interfere and the users that are there, it will be heard by the site up on the hill and cause interference in the network.

So all the sites work on the same frequency. They balance themselves out. In a room like this, if you were to talk about it in a wedding situation, you have a bunch of tables in the

wedding. If you think of each one as a cell site, everyone can talk to each other. That's how some of the cell systems work and as long as you are near a cell site or the table, you can have a conversation at the table. If you have a large site, kind of like the band in a wedding, and the speakers get turned up and they blast out at a higher volume, then people can't have a conversation anymore. That would be the situation if you have something that's too high and you don't have the ability to control that signal and be able to angle it downward so it doesn't go too far. You wind up causing interference so that other users can't communicate.

Q. From a radio frequency perspective and a site suitability perspective, is this particular location roughly centrally located between the existing on-air Verizon sites?

A. It's centrally east-west. North-south, we are not going to have a center. What we have, if we go north, the Board is familiar with AT&T on the tower in the north and then, if you go further north, I believe all the other towers are Wetlands because there's a lot of brush and wet areas. By the church where T-Mobile and AT&T have a temporary site, if you look at the right of way,

it's all cattails and marsh. I guess it's low and it drains in there. That's a scenario that we can't develop on.

So if we want to center this a little better, we have AT&T to the north and then you have -- you can't use any of the towers that are north of Shunpike. Going south, there are some towers that are usable and some that aren't and I know that T-Mobile has a temporary site at the pool and they will be looking to collocate and move to one of the towers that PSE&G has finished.

Q. With respect to this particular site, as you mentioned, is the topography here advantageous from a radio frequency perspective?

A. For our particular spot, it is for providing coverage. We have to balance that a little bit because it is relatively high. It gives us the best shot of covering to the northwest and to the southeast. The school is still at 350 feet ground elevation. We have a better shot of covering east and west and the top of the ridge. We just have some challenges trying to get down to the valley that we have to balance to the north and then, the next part, you would go down in the valley to the south and try to get a lot of Fairmont and

Southern off the future site. That would be the grand plan.

Q. This particular exhibit is showing new coverage, reliable coverage, at the high school?

A. Yes, showing that the proposed site would be covering the high school.

Q. Which is, as you stated, a high usage area?

A. Yes.

Q. Before we move onto the capacity, we will take questions on these particular exhibits. Have you also investigated the possibility of using municipal property in the area?

A. I'm not aware of too much municipal property in the area. I know there's a firehouse but that's down by Southern Boulevard. Schools aren't necessarily municipal property. The Chatham site, that's DPW. I'm not familiar with any other municipal property that is in the general vicinity of Chatham 4 and Shunpike.

Q. How about the Colony Pool location?

A. That is the one that T-Mobile has a temporary site on at School and Spring Street. There's an electronic transmission tower next door. That is what somebody is going to use as an existing

structure before they build a new permanent site on the pool.

Q. In your opinion, would you be able to cover this area along Pine Street and the area you described by moving the site further in that location?

A. To the Colony Pool? No.

Q. As you stated, this is a two-site solution?

A. The Colony Pool is an alternate to the Southern Boulevard site than it would be to ours because it's down below at a much lower ground elevation. It's at 320 feet or so. So you would have to get up to 360 and come back the other side and it's just right on the other side of Pine Street. You have about a 20-foot drop. The next tower up is 30 feet lower than we are.

CHAIRMAN VIVONA: The next tower up, is that the one by Division Street?

MR. PIERSON: Between Shunpike and Pine.

CHAIRMAN VIVONA: But there's another tower and a vacant lot on Division Street and Shunpike and I believe the next one is your Florham Park 2. There's a tower between those, at least

one.

MR. PIERSON: There's five towers between this proposed and Southern Boulevard.

CHAIRMAN VIVONA: I'm going from Pine Street to Florham Park 2.

MR. PIERSON: There are several towers. They are every thousand feet, approximately.

CHAIRMAN VIVONA: What's wrong with the one at 124 and Division?

MR. PIERSON: That's down. I know 124 and Brooklyn. If you cross the street, I don't know if it's Division at that point.

CHAIRMAN VIVONA: It divides Chatham and Madison.

MR. PIERSON: You come down and you have the right of way. The tower is on your left. We are just at the north end and there's a bunch of apartments on your left and then you cross 124 and then you continue down to the railroad tracks, all low elevation, 220 feet, and then they finally start going up the hill towards Shunpike. If you are coming down in the valley, it's going to be 50-percent redundant with Florham Park and it's going to get to Shunpike and that's it and have a large

gap on the top of the ridge going to the northwest and southeast. Along the ridge up there, it's 360 feet ground elevation. So something at the bottom will cover up to Shunpike and that's it. So it will cover that little strip if they were available and they weren't wet, if the ground underneath them isn't Wetland, but I know that a lot of them are. Then, you are talking about a three-site solution. You can move -- do something there, move it a little south but you can't take the Southern Boulevard one because that's all swamp and we are not sure we are going to use the one south of Southern Boulevard either.

MS. ROMANO: Wouldn't you be using existing ones?

MR. PIERSON: Yes.

MR. FERRARO: But there's a ground equipment component to all of these sites.

MS. ROMANO: So that's why you can't go on Wetlands?

CHAIRMAN VIVONA: Yes.

MS. ROMANO: There's no cellular antennas on any of those; it's just PSE&G towers?

MR. PIERSON: You have to define "any of those." If you go to the north, AT&T claimed the

next tower up and when you cross over, that's where the church is on the left and the next several going down the hill have Wetlands issues. As you go south, there's a mix. Some of them look like they are clear but there's a buffer area that I'm not clear about. I just get told whether it is in the Wetlands or a buffer area but those are on the southern part of the hill so they are not going to cover to the north.

MS. ROMANO: What about where AT&T is? If they are on there, I'm assuming it's not a Wetlands issue.

MR. PIERSON: That's 30 feet down from ours.

MR. MICHAELS: I take it there's more than one on the PSE&G tower?

MR. PIERSON: When we first started this project, we said "Which ones can we use?" At the time, T-Mobile had a reservation on that and they told us "You can't use that."

MR. HYLAND: T-Mobile had a reservation with what?

MR. PIERSON: AT&T. When we were first starting and we went to PSE&G, they said that one was unavailable and there's only three places

you can mount antennas as per PSE&G on these towers. You can go above, like what we are proposing and what AT&T proposed for the next tower north, and you go to those set of lines on the top. You have the arms that support the static lines. Then you have about 7 feet between those statics line arms and the next set of arms that support power. You can go in that 7 feet if you can fit in that 7 feet and the next spot you can go is all the way below the power lines. That's going to be below tree lines. That's usually almost never used. So you really have two spots that are possible if it passes the structural.

MR. SHAW: One of the issues that was discussed on the AT&T application on Shunpike was the potential for collocation on that tower. We specifically reviewed that as a possibility. We discussed where to have the equipment shelters located because that might be necessary. You indicated there is a second height that could be used on that tower?

MR. PIERSON: There's a possibility. There are -- that's what I was getting into. You only have 7 feet. Our antennas are 6 feet tall. Antennas do not like to be near other steel going up horizontally. It is going to affect the pattern of

the antenna. It wants to see clearly out in front of itself and the arms would be out in front of the antenna and you would have arms above you and below you in that situation. In order to be able to control the signal -- it depends on what you are trying to put up and it depends on structural.

So Verizon has four frequency bands, just like AT&T. We need 12 antennas to handle everything that's going on efficiently and try to get the most coverage we can. So there are some carriers that do not require as much. They don't have as many frequencies or bands, such as T-Mobile or Sprint, and maybe they can get by with six antennas that are mounted differently and maybe they can fit and maybe they have structural. There's a lot of different questions on whether, A, we can fit a full Verizon array structurally and then, obviously, it's only 7 feet tall. That means you have six inches from the bottom antenna to the arm that's sticking out 15 feet. Our platform is only going to go 6 feet. That's significantly in the way. We have 2 feet from the bottom of the antenna to the arm for ours and I believe the top arms are not as long. I think the top arms are not as long as the power arms.

MR. HYLAND: T-Mobile, they applied for the Spring Street location.

MR. SHAW: Two locations.

MR. HYLAND: Yes.

And Sunset. If you look, we are going to have somebody on Shunpike, then this one on Pine and then you go two locations away, we have one on Spring. It doesn't seem like anybody is making an effort to collocate. That may be worth saying to the Town Committee that we should put the kibosh on people using different sites.

MR. SHAW: One of the things you will have to hear is the consideration of alternate sites. Each applicant would be required to demonstrate that they reviewed what alternates are available. I would think, when those other applications come through, we need to inquire whether they could be collocating on those towers.

MR. FERRARO: To preview the testimony of our professional engineer, PSE&G policy on these new type, monopole type electric transmission towers, they will not allow more than one carrier above. So there's one extension permitted and in that case, the pole near Shunpike, that's what AT&T's plan is, to go above the tower, is almost

identical to what we are proposing here. They will not let someone go another array higher so the only option is whether that particular carrier can make it work at the lower elevation and with the interference attenuation issues that Mr. Pierson described.

MR. PIERSON: If I can finish up, where I was going with this, the difference between the AT&T -- or the Shunpike tower, the difference between that structure and our structure is, A, we have to go below AT&T. We have additional interference because the steel is closer 6 inches from the antenna rather than 2 feet from the antenna. It's 30 feet lower in ground elevation and the center line would be 10 feet lower than what we have now. So we are taking a hit and we moved ourselves up 1,000 feet. What that's going to do is take this proposed coverage that we have and move it up 1,000 feet. The school starts to get a little on the edge but then, since it's down on the other side of the hill, you are probably going to lose the school and since you lost height, it's going to shrink it on the two sectors and go 125 degrees true north to 320 and those are going to back off because we are lower and the ridge is still up high. That's

the net effect of Verizon moving up one tower.

MR. HYLAND: It would be interesting to see those numbers as opposed to a guess.

MR. PIERSON: I don't consider that a guess after looking at this for 30 years.

MR. HYLAND: You said that the school would be on the edge?

MR. PIERSON: If we had identical coverage, it is going to take that coverage -- if we were in Kansas and everything was flat, that's what it would do but it's going to be more than that because you also lost height.

MR. HYLAND: But now, we don't have to angle down.

MR. PIERSON: The angle down is only going to the north. That's the north issue.

MR. HYLAND: I guess the question is: How hard can we expect you to have to work to make a less-than-perfect solution happen? In other words, you can say "It's only going to work if we get the top spot and because we can only use the top spot, we can only use this pole." It seems like the community should have an ability to say "We need you to work a little harder to try to make the middle spot work so that you don't disturb as much ground."

You don't have to build as many driveways to service these. So that's all of the negatives in one spot as opposed to every other block right through the middle of the town.

MR. PIERSON: The alternate thought on that is: There are four carriers. You have AT&T and Verizon that have the most customers and the most traffic and the most frequency and Sprint and T-Mobile. T-Mobile had a search area on the AT&T tower. They had a reservation there. That was temporarily taken away and at this point, they are budgeting their money somewhere else for whatever reason. Do they still need something there from a coverage standpoint? Most likely. Will Sprint, when they start building again -- they are still trying to resurrect their company. If they come back and they start building, then you are going to have four carriers. You are going to have to put two on one pole and two on another pole. So it may not be today or three years from now but, eventually, you are going to have four carriers because we got rid of Metro PCS and some other things. So it all depends on your future plan. Do you want to --

MR. HYLAND: We have an application

from T-Mobile for a third site. It's not going to be collocated.

MR. PIERSON: Correct. But they are down the hill at the pool. So instead of going down by Shunpike, they went near the pool and depending on what happens with the engineering on our future site down by Southern, that may have to move up one pole. It may have to move up two poles and collocate with T-Mobile.

MR. HYLAND: From the community's perspective, we might want you all collocated on one pole.

MR. PIERSON: I can't cover it all on one pole. It's too big and too much traffic to cover with one site.

MR. HYLAND: This is what I'm trying to figure out. If you guys worked really, really hard and spent a lot of money, I'm sure we can come up with a solution. That might not be fair to have you guys spend that money and work that hard but where's the balance? How much work can we expect them to have to do to work around the fact that they are going to be 6 inches away from the steel as compared to 2 feet away from the steel? Is that covered in FCC law, for lack of a better word?

MR. SHAW: Those are part of the proofs for this Board to consider, whether the applicant has properly considered alternate sites.

MR. PIERSON: We know that -- it all depends on what's going on with the Colony Pool. We need to go north and south and east-west. If you go by the pool, then you are taking coverage from -- you are moving it up Fairmont and you are losing coverage down here. That means, now, we need to go on the hill, where I put T-Mobile on the hill, that they -- as you go up the hill, it splits and then they go up the hill. I did that application the first time before the towers were replaced. That says, "Okay. Verizon, now you can no longer" -- You are going so far up that you are going to need to go and put something else down south.

So they are all kind of mixed and move a little bit together but there are a lot of factors and depending on -- do you want to plan for four now? If you think four makes sense that you have the AT&T and Verizon on the two? They need the extra antennas, etc., and then Sprint and T-Mobile would collocate below those two and then you have everything taken care of? In your ways, you say, "Okay. Verizon, you need to go up to the other

tower and do a structural and find out if the tower can handle everything you need." That may pass or not pass, in which case, then -- the last time --

I have done a lot of PSE&G sites. I haven't seen how long a structural takes lately but it used to be almost a year. So that would be a year delay in getting that. If it worked, then you are looking at another application. So there is a time factor and the time factor plays into the capacity, which we haven't even gotten to yet.

So there are a lot of balls juggling here and you guys will look at it from your side, which is the most important thing, and I'm trying to present what we are thinking at Verizon as the right thing. We said "Which tower? If AT&T is going on that, if that's the right idea, maybe we can make that work but tell us which tower is available" and they told us "Don't go there; go here."

MR. HYLAND: That's PSE&G that told you that?

MR. PIERSON: Yes. So we put all our effort into the one here.

MR. HYLAND: On your after map, is everything in white not covered?

MR. PIERSON: From this frequency band

-- remember, we talked about the high frequency band? It doesn't meet the criteria for in a residential structure. So will you have coverage if you are standing in the street in some of those areas? Yes. Will you not have coverage in some of those white areas at the higher frequency band? Yes.

We have to make a cut-off somewhere. It's not very stringent; Dr. Eisenstein can comment on that. He's familiar with it, whether he thinks we are being stringent or optimistic, but those white areas on this frequency band are going to be unreliable for suburban design.

The Homeland Security Act that was initially done in 1999 and was revised in 2003 said that telecommunication services are important and we need to go for seamless, ubiquitous service and try to get everything that we possibly can. Some things are a little more difficult, such as Chatham. We are doing the best we can trying to put everything together and trying to use existing structures and trying to make a plan.

MR. SHAW: As I understand it, for you to fill the gap, you are proposing a two-tower solution?

MR. PIERSON: Yes. For Chatham.

MR. SHAW: That would be the application on Southern Boulevard that was deemed incomplete on May 7, 2015.

MR. PIERSON: That's the future dot.

MR. FERRARO: Shown as Chatham 3 on Exhibit 13 and 14.

MR. SHAW: What does the propagation map look like for that?

MR. PIERSON: I do have a preliminary, I believe.

MR. SHAW: Does that overlap with Chatham 4 and reduce the need to have Chatham 4?

MR. PIERSON: It's not going to reduce it because you can't get over the hill.

MR. FERRARO: I think the question is: The Board wants to see why we need two sites.

MR. PIERSON: As we see, we don't have coverage all the way down Southern Boulevard.

(Exhibit A-16, future Verizon coverage, was marked for Identification.)

MR. PIERSON: This has an orange tint to the coverage. That's at this frequency band. We are matching up pretty well with Chatham 4. We get a little more to the south. It's going to help the

coverage in the lower bands, the 700 and 800 bands. So some of the areas down in Fairmont, it's only a small strip of land between the top of the hill and Fairmont to the Swamp. That may suffice. There's not a huge demand on traffic there like the densely-populated area in the north.

MR. HYLAND: Does that cover the high school?

MR. PIERSON: Right up to it.

FURTHER DIRECT EXAMINATION BY MR. FERRARO:

Q. A-18 is the coverage to be gained from future Chatham 3 if it were approved?

A. Correct. It's a preliminary coverage plot since everything hasn't been worked out yet.

Q. Does that assume that the antennas are going to be located in a similar fashion above the tower?

A. I believe so. I believe they are all designed the same so it would be antennas above the tower.

Q. Lowering the antenna, would that impact how much coverage you get from the site?

A. It would make that slightly smaller. Ten feet will do a little bit. It might be a couple hundred feet. From that standpoint, you are looking

uphill, which probably wouldn't change too much going uphill. Going down to the south, I think you are going to have more of the same.

MR. SHAW: Is the dark green area overlap between the two towers.

MR. PIERSON: There's overlap between Chatham 4 and 3, basically, from the southern portion of the school out towards Fairmont. There's a section over there and you can see overlap directly west after Chatham 4 and then it overlaps with the Chatham site to the west as well, the future Chatham 3 site. So it fits in pretty well in this frequency band. Then there will be increases in efficiencies for the lower frequency bands as well.

Q. Are the overlaps significant in your opinion or acceptable from a radio frequency standpoint?

A. They are acceptable for this frequency band.

Q. I guess the point of this exercise in introducing A-16 over A-15, was it determined based on the propagation model whether you needed two sites in this particular area? What's your opinion on that?

A. I believe you need two sites to make it work, yes. If we move -- there's a lot of variables. If we move to the next tower, we are losing 40 feet. So this is going to spread this apart a little bit and then what's going to happen, you don't necessarily want the overlap in the middle of a high traffic area. This is cutting off just before it from the Chatham 3 because it's less efficient. If you have two sites going into the same area, you are better off covering it well with one instead of them bouncing back and forth from site to site and it takes so much time doing management, trying to find out where the portable is. So if you have high traffic areas, you want to concentrate on that area.

Q. Is that what you did at Chatham Downtown; is that the same idea?

A. Yes. Basically. There's a lot of masonry buildings in that part of the strip on Main Street so that's really to get into these establishments. So we have a small site, maybe 30 feet tall, to get the in-building and offload traffic from shopping and people sitting in traffic, etc.

Q. When AT&T was approved at that Shunpike

location in 2006, it was a different structure on that property at the time. It was the old electronic transmission tower?

A. It was the lattice tower with a Fort Worth insert. That is a monopole that goes up the center and uses the structure of the lattice to actually provide its lateral strength and then it pokes up a little bit above the tower where you can put a platform. So it's a monopole inside of the lattice.

Q. Based upon your experience with those, have you seen multiple carriers located above those old type of electronic transmission towers?

A. I have designed them many ways with the antennas on the steel and Fort Worth. There's a lot of different methods we use. It depends on the tower and the structural capacity of the tower and if nobody is on the tower and how short and tall is it. Will it meet the objectives? There's a lot of variables. Every time you go up to one, you have to address it uniquely.

Q. So based upon your experience, this limitation that we have on the new PSE&G towers is new with respect to the ability to put one carrier above only?

A. Fort Worth usually could do two but I don't know if I have ever seen PSE&G allow two but with those old ones, the lattice would go up and it would have two-points on it. You could do a Fort Worth on one side and on the other. I have seen that done as well as putting them on the steel itself down in -- south of 78, there was a tower. I forgot the town at the moment but there was a tower that we had three carriers on it but it was a lattice. One is wider.

CHAIRMAN VIVONA: As far as the antennas go, higher is better, correct?

MR. PIERSON: Sometimes.

CHAIRMAN VIVONA: If Verizon were to construct its own tower over behind Tanglewood, there's a sewage treatment plant and a recycling center with no homes on it. Why doesn't anybody build their own tower and make that 300 feet tall? Because it's away from the neighbors. There's no box. You can't see it and if you do see it, it's out in the distance and you guys can rent the other space to the other four things. Why does it always have to be in a neighborhood because it's easy for the big companies?

MR. PIERSON: It's where the people

are. The phone only has .6 watts. That is the maximum the FCC can do it. That's what defines how far you are going to cover on the site. That's the limitation if you have people that are talking to people in basements in the Mac mansions that you were talking about with these homes with the finished basements. The consumers are looking for that particular grade of service. If we are so far away, even if it's 300 feet tall -- and then you have to light it for FAA. It's all about the angle and how much clutter, trees and buildings and things. What do you have to go through in that 200 feet? If I'm another mile, I am never going to cover somebody in a house from two miles away. It's not going to happen, unless it's on a bald hill and you can see it and you have a line of sight to it because we are limited to what the phone can do. We are not --

You have to come down through the trees with the coverage in order to provide coverage in an area. If you are going all the way out and you are expecting to get into the trees that are two miles away, you are going -- you're not going to do it. If you increase your height from 200 feet to 300 feet, you haven't significantly increased your

angle of attack through that trees and clutter from 10,000 feet away. A 100-foot increase at 10,000 feet away is irrelevant. It's not going to make any difference. You need to come in through a given angle so you don't cut through so many trees. You are not going to get very far if you have some height. You are only going to go through 200 feet of trees as opposed to if you are trying to get from a long distance. It's not going to cut through all the trees to get there. You are going to travel above the trees and make a right angle and come down and it just doesn't bend like that.

So, yeah, the far-away sites are sometimes good but -- there is a site that we found that was an old cable tower, 200 feet tall, by Basking Ridge and it was a cable tower and nobody was on it. It took me two hours to find this tower. If you went where the municipal building is in Basking Ridge, if you look east, you can see the top of that tower. As soon as you went around the corner, it was gone but that's out in the middle of the woods in a swamp but it still is going to cover three-quarters of a mile to a mile and that's all you are going to get out of it. There's not a lot of people within that site. It's not helping

anybody and not going to help the traffic issues that we have coming up here. That, we haven't gotten to yet.

CHAIRMAN VIVONA: This coverage is not helping a million people either. This coverage is helping, maybe, 150 houses in that area. They are not all Verizon customers, of course, but in those 15 roads is maybe 150 houses.

MR. PIERSON: The 2010 census around this coverage area was 3,000 and -- the number I gave you previously.

CHAIRMAN VIVONA: There's only 5,000 people in the township.

MR. PIERSON: That's people that -- we have taken that number from the census. It said 3,472. I can double-check it.

CHAIRMAN VIVONA: I wish you would. There's only 5,000 people in the township.

MR. FERRARO: How many students attend the high school?

CHAIRMAN VIVONA: 1100, that's the entire Chatham borough and township, not this 15-street area. I believe the coverage is addressing some of the high school property as well.

MR. PIERSON: That's not in the

census.

CHAIRMAN VIVONA: Is there a system available that is more localized that they can go on telephone poles to populate that same area as opposed to going on an existing tower?

MR. PIERSON: There are other methods. Everybody has talked about them. I would have to reference the case of T-Mobile vs. Paramus. We went to federal. My firm did the original testimony and in federal court on that. The judge looked at that as, you can put -- everyone says "Put a bunch of Chatham Downtowns out there at 35 feet." Well, Chatham Downtown is a real site, just a small one. So you would need quite a few of those in front of quite a few houses in order to get that. You are looking at --

This is open. There's not a lot of trees here. It's a downtown business area. The signal is going to go further in that area than it would be in the treed area that we are talking about trying to cover here. The trees are 90 feet here. We are looking at putting the antennas at 35 so you are not going to get very far.

MR. HYLAND: You mentioned that downtown had a lot of brick houses, right?

MR. PIERSON: Right.

MR. HYLAND: Are those hard to get into?

MR. PIERSON: To get into but you can get down the street very well. When you get into the building, you have loss just like going through the trees, basically. You can have good signal to the front door and it's going to diminish as you go into the front of the building. I will have good coverage to the front door but if I'm going through trees the whole way, my signal is getting attenuated each step; whereas, if you are going down a clear street, it does not have as much loss going down an open street. But even if we said we can do that, you are getting ten of them to get the coverage of that.

CHAIRMAN VIVONA: Explain to me what that is? I know it takes a whole lot more. I know it's lower. The big question is -- problem with the whole system is not the antennas. You don't see them. You are not going to see them. You are not in New York City. You know there's a pole and you know there's something on top of it. The problem with the whole situation: You have an ugly box that emits noise that has wires that is haphazardly

thrown in someone's back yard. That's what everyone is here for. They don't want to see a barn with a generator. They don't want any of that. If we were to do these smaller units, what does it entail? Is there a box attached to each pole antenna hardwired through? How does that work?

MR. PIERSON: Basically, it will consist of a box. They vary in size. Most of them do everything that we are trying to do out of this, all the different frequency bands and everything. You are probably looking at a box 2-by-2-or-so feet tall, in that range. That has to be on the ground or on a telephone pole in a right of way and then go up and you have an antenna there and it would cover a couple hundred feet in each direction. If you are in an area like Bernardsville, the houses are 400 feet from the street. It's useless there. Here, most of the houses are a little closer to the street. You would have to have a box on the street.

This is where the whole discussion with the judge in the Paramus case came up. He said between -- Dr. Eisenstein was there as well. Can you physically do it? Yes, you can physically do it. But the decision of the judge was: Is it equal? And the thing is, it is not equal because

you cannot have backup power on the poles. So if commercial power goes out, it's gone. In situations, you are not going to have the wireless coverage you have. You are more prone to outages from trees going down because, now, it's a wired system. You have to wire it from pole to pole to pole. You have wires coming into these sites. I can get them to come in. So if I lost something, I lose half. So there are pages and pages of testimony. The decision was that it's not an equal replacement if there is something available because there are drawbacks that reduce reliability and coverage and there's a lot of planning testimony that I'm not familiar with. But the bottom line was: It's not equal.

We have an existing structure and even that case was for a new structure. So they were balancing a new structure versus a bunch of the smaller sites or nodes or DAS systems and that is what the bottom line came up to be. Also, depending on which one you do, you have some issues with 911 and people because all you know is how far the user is from the antenna. You don't know which direction to go to find it. Unless the GPS in the phone is working and it can tell you where he is, you are not

going to find him through the network. There are little pieces that just don't add up. If there's no property, if there's no existing structures and nothing else you can do, then you have to do something, then maybe that's going to raise to the top.

In Paramus, we had two properties that were available. Here, we have an existing structure. So that's where, from a network perspective, it's not a good idea from -- unless you have some coverage from someplace else and you are trying to do a little hot spot, you are trying to do a major traffic area, but if that goes away, you still have coverage because you have got macro sites on buildings or towers around it and you are just trying to get off a little hot spot of people.

Downtown Morristown, during the Saint Patrick's Day parade, the system blows up. So something like that may be good in those types of areas because we have tons of buildings with other sites on it. If the power goes out, it's not that big a deal because we will have other sites that handle it but in a high traffic area, when power is on, it's going to provide benefit to the network so the users -- there's a lot of different pieces

involved in this situation. It's kind of been decided that doing that distributed type system and using telephone poles -- you can't put it on commercial buildings. This whole area is 99-percent residential. You have churches and cemeteries and the firehouse, another church down by Southern and School. It's a difficult area to cover. That's why it hasn't been covered yet.

MR. FERRARO: There was some feedback in the initial meeting, the concern with the ground equipment. We have been able to make some modifications where we could eliminate the shelter, as our professional engineer will testify to, so you would not see the shelter sticking above the fence and since we are not going to have a shelter, you would not need air conditioner condensers so that gets eliminated. So we do have some alternatives to show to the Board and the public how we can minimize any nuisance value of this facility.

MS. ROMANO: So we are saying that these antennas are pretty much going to help serve more data coverage in the higher frequencies?

MR. PIERSON: From a coverage perspective, the primary focus, yes, and that's where the data is being used right now but also,

everybody is going Voice Over IP. If you have a cable modem, that is not a regular phone line. Verizon has Voice Over LTE. So all these data networks are starting to handle voice. So right now, if you have a phone, the latest phones, the Samsung 6 and the iPhone 6 can do voice over data. That's where everything is going to. So today is very little bit of voice on the data network but each year, it will be more and more. So these will handle the 911 calls, etc. It will help and improve the in-building coverage at the lower frequencies and we haven't gotten to the part where it helps the data network at the lower frequency.

MS. ROMANO: Since this is a residential area, a lot of people have WiFi. Does it help improve the WiFi coverage or only when you are streaming data if I'm not on WiFi?

MR. PIERSON: This is only helping when you have your phone set to be on the Verizon network, not on your WiFi. If you go in your house, it's like a personal solution. So when you are in the house and you set the WiFi and you have your phone set up -- my kids do that because they use way too much data than I'm going to pay for so they will offload it. It's a personal solution.

MS. ROMANO: We are in a residential neighborhood. Everyone is not going to be using the data. We are going to be using the WiFi in our homes.

MR. PIERSON: Some do and some don't.

MS. ROMANO: I'm trying to understand. At the school, if they are using laptops, hopefully, they would have WiFi. If it's for kids in lunch streaming videos and stuff, I don't see that being a need. Being in a residential neighborhood, I would think, "Yes. I see a need for it" but I don't know if I see a need for it as much when everyone has their personal streaming devices in their home.

MR. PIERSON: I understand where you are coming from but the WiFi and people going onto the WiFi is -- basically, it's another offload strategy. If nobody had any WiFi, the wireless systems would not be able to keep up with the data. So you will see the data that we are running on the site surrounding it next. So that actually is helping keep things somewhat balanced. Even with people doing that in the areas, the residential area, the antennas pointing towards this zone are having issues even though people are still offloading to WiFi for those that are savvy enough

to know how to do it.

Mostly, the kids do that but we cannot discriminate what data goes over, what the customer is using it for, whether it's Facebooking or e-mails or a 911 text or whatever. We can't discriminate for whatever the customer wants to use it for. So to us, it has to be treated the same and many police departments are using the LTE data network in the police cars as well so we have to treat it all the same. The WiFi is helping the larger networks keep up with the massive increase in data. If people didn't have any, we would be in trouble. It's part of the solution.

DR. EISENSTEIN: I don't disagree with anything Mr. Pierson has said. He stated the case accurately.

I would like to make a couple of points for the Board and the public. There's a tendency to look at these propagation plots the way we look at other data, that they represent an exact representation. That is far from the truth. A wireless system is inherently random. The propagation of the wireless signals can go all over the place in terms of the amount of power and what you get. What these plots are showing is the median

of the coverage. So in other words, 50 percent of the time, it will be better than what he's shown on this. You get a higher level of coverage. 50 percent of the time, it would be worse. So they pick a design criterion such when the fading is bad, you will still have enough network that you would be able to use the network. When it's good, it's just a bonus.

One thing to bear in mind, this is a representation that one would use for design purposes; it is not exact. I'm often asked whether or not they are better off with drive test data, where they drive a car around and take the measurements there. In my opinion, from the viewpoint of using it for design, drive test data is worse than the propagation plots.

And why? Because you are getting a snapshot at the time you take the drive test. You could go by the same route ten minutes later and it would look completely different and you could go by three minutes later and it would look different.

I have many occasions where I stand on a corner out on the street with a power meter and what you will see (gesturing) -- and I'm showing with my hands -- is the needle wavering and you may

see a 10- to 20-dB swing in the amount of power standing still not doing anything. That's just because of all sorts of conditions around, including a truck going by a block away, an airplane in the sky. That bounces the signal funny. Somebody moving their aluminum blinds, that focuses the radiation over in a different direction. There's all sorts of things there.

So what you have to do is you have to look at this as guidance in the same way that -- if an engineer were presenting a design for a bridge and they said "We want to design this bridge to handle a certain amount of tonnage and amount of cars per day." You wouldn't expect that to be an exact number. You would expect there would be a factor of safety so if there are more cars, the bridge wouldn't collapse. If it is less, so much the better.

The second point I would like to make, a point that Mr. Pierson made, I think it gets passed over a lot. What he shows is this is the propagation from the tower. Because the tower is in a fixed location, we know where it is and what the propagation plots will look like. That is not the way you design a cell phone system. It has to be

designed from the viewpoint of the handheld device. That's the weak link in the system. They only put out six-tenths of a watt. People want to have long battery life and the new ones are two-tenths of a watt. Their coverage is very limited. You are often putting it up to your ear; your head blocks the signal. If you don't have two-way communication --

This is not a broadcast system like a radio or television station and at home, you get coverage out there. This is a two-way communication. There has to be communication between the handheld and the tower. If you don't have that, you don't have communication. So a lot of the discussion I have heard about moving it here or there or creating a little gap or reducing it, it doesn't affect them. It does affect the ability of the user to access the information from their phone. That's where the difficulty comes in.

In terms of, there's some overlap in this, the overlap is necessary because, intrinsically, we are looking at a cell phone system and Mr. Pierson has been concentrating on people using it in their homes but the fact is that many people use these, in this particular case, in their

vehicles. I know the laws in New Jersey and people have the Blue Tooth systems so they are compliant with the law but the fact is that vehicle traffic along a road like Shunpike is very important, you need the overlap so that when someone has a call, they are on the call, they are going from cell to cell, that there's enough overlap that the call can carry from one cell to the other. If there's a gap, even a small gap between the coverage from the two cells, you drop the call as you are going along.

And the other part of the story is, I haven't seen the percentage recently of 911 calls that are initiated on cell phones but it's climbing. It may be up in the 80-percent range right now of 911 calls. The 911 call has to go through. It's, by definition, an emergency. And when do you have the worst emergencies? Usually, when it's bad weather. So all these propagation plots are going to change enormously when there's snow on the ground, when there's a heavy rain, because the signal doesn't propagate through the moisture very well. So you allow a factor of safety in the system. You design for the median of the good design, not at the very limit of where the phones will work because, in an emergency or bad weather,

you want to be able to make the calls if you have to, particularly 911 calls.

And the other point which Mr. Pierson made has to do with the 1999 Act. A lot of the coverage things were covered by the 1996 Telecommunications Act. The 1999 Act that was amended in 2003 requires the providers to have -- the words that are used in that Act are "ubiquitous, seamless coverage" and to be able to locate a user within 100 meters of the place where they make the call without them having a GPS system on their phone. They modified that because it turned out to be a much more difficult problem. The weaker the signal is, the less ability you have to triangulate and locate the people within the range to satisfy the E911 requirement.

So there's all these factors that make this very complicated. That doesn't tell you, as the Board or the public, that this is or is not a good site but the evidence, as presented, you have to take it in the context of modern cell phone systems and the design and that's all I have to say.

I don't have any questions.

MS. ROMANO: For the 911 calls, is it true that, if I'm Verizon and I am making a 911 call

and I can't get coverage, would it go to an AT&T site or a T-Mobile site?

DR. EISENSTEIN: Maybe Sprint but that's not the issue. The issue whether or not you can make the 911 call is not the issue. It's a question of, as soon as you dial 911 from your home, they know immediately where you are. You don't have to give them an address; you don't have to do anything. That's what the FCC requires the providers to do for cell phones. When someone makes a 911 call, it will light up on the screen to say that this is where they are to 100 meters in the location.

MS. ROMANO: That is for the higher frequency?

DR. EISENSTEIN: It could be at the lower or higher frequency.

The other point that he made is, eventually, all the calls that we will make, telephone calls, it will all be data. There will be nothing going over the network except data. The old notion of voice propagating through the network is gone or going. It will be gone shortly. So that data is data and it doesn't matter whether the data is your voice call, a 911 call, a game that's being

played, a Facebook entry; it's all data. That's the way the systems will be going. That's what's known as LTE. That's the way the cell phone systems will work. So it has to work. Eventually, they will migrate all their frequencies to LTE. Right now, they are doing it at the higher frequencies, actually 700.

MR. PIERSON: That's the primary channel. We only have 10 there and 40 at the higher, which is shown on the exhibits.

DR. EISENSTEIN: Eventually, everything will be LTE and all your phones will be Voice Over LTE. That's the new technology for voice and there would be no difference in data. The receiving end, it will decipher it and figure whether it's voice or data.

MR. PIERSON: Does anybody need a break?

CHAIRMAN VIVONA: Let's take a recess and come back at 10:00.

(Recess taken)

CHAIRMAN VIVONA: Let's give a time synopsis.

MR. SHAW: It's almost 10:00. We have to discuss some pending litigation around 10:30 or

so.

MR. FERRARO: We will have all our witnesses available. We will jump right in.

FURTHER DIRECT EXAMINATION BY MR. FERRARO:

Q. Mr. Pierson, you remain under oath.

A. Yes.

Q. The next exhibit that you are going to review with the Board is A-17?

A. Yes.

(Exhibits A-17, A-18 and A-19 were marked for Identification.)

Q. Mr. Pierson, the board-mounted sheets, are they exactly the same as what's indicated in the three sheets of A-19?

A. I marked them the same. They are identical to what's been handed out to the Board.

Q. A-17 was prepared by you or under your supervision; is that correct?

A. By me.

Q. Could you describe what A-17 is?

A. We will start with A-17A, Florham Park 3, Sector 2. This is a chart of actual data usage on the 700 megahertz LTE channel. The blue line bouncing up and down, that's the data. There's a point for every day. It's the third busiest hour in

that day. So what we don't want to take is the worst case; it blows everything out of proportion. So we take the third busiest hour and that's what plotted on every day of the week from September of 2014 up to November of 2015. That is when I prepared these. I didn't have the December data yet.

The blue line or purple line is the actual data on one of the sectors, the antenna on Florham Park 2. If I look at Florham Park 2, which is in the upper portion of A-15, Beta is 220 degrees. That sector is pointing right down the right of way towards Chatham Township. So that particular sector is pointing in that southwesterly direction. That's the usage from that one particular sector.

There's a red horizontal line; that's the maximum design capacity for LTE for this particular site. That line varies based on where the users are. Are they clustered very close to the site? Are they very far from the site? Are they in dense, masonry buildings? So that line varies based upon each particular site and situation that it's located in. That's a line that you'll sometimes see a day that you will go over that spike but that's

when things start happening; whereas, your data, we don't meet the data that we are supposed to be getting on a broadband network. Some people will be kicked down to 3G data. That was ten years ago. It's hundreds of kilobits per second or sometimes, you will be denied and you will have latency and delay in what you are trying to do. That's a real problem when you are talking about Voice Over LTE. That would be breaks in syllables; you lose words or have to disconnect and reestablish a session. That's what starts to happen when you cross the red horizontal line.

There are two tan lines. One is a straight trend line based upon the data and that's the lower of the lines and then there's another trend line that is reflecting what the data projections definitely could be because of the increase in the data usage every month. So what we figure is, this trend line is going to hit the capacity line somewhere in the June time frame of this year. It could happen earlier; it could be happening now. I haven't checked the stats lately. In this range, if the trend keeps going, that's what is going to happen and we are going to have an issue. It's an immediate issue. It's happening now

or in the next six months of this particular sector having trouble since our coverage at higher frequencies isn't very good here.

Having the higher frequencies, the 2100 and the 1900 frequencies, is only going to help these people close into the site, not these other people that are further out towards Shunpike that might have coverage at the higher because we put higher frequencies in these other sites. We already added the LTE carrier to try to offload this but the higher frequency carriers aren't helping because the coverage isn't good enough to make a significant impact. So that's why this is a two-prong approach. We need to improve the high frequency coverage so that the higher frequencies can take on some more of the data and offload the 700 megahertz LTE channels.

The next one is for Madison 2, Sector 1 Alpha at 130 degrees. We are looking at Madison 2 at the antennas that are pointing this way, anything throughout the middle of Noe, between the railroad tracks and Shunpike and up towards the Florham Park 2 site. So it's shooting down the tracks. That area, that site is also having issues. It's going up and down. We do have some certain days that, obviously, you have major spikes coming in. That

one says it's going to take a little longer, towards the end of this year, until we start seeing some issues on that particular sector. It's coming; it's just not quite as bad as Florham Park and then the worst one, the Chatham site that's down the road on Southern, the sector at 100 degrees which is pointing, basically, right halfway between the future Chatham 3 site and our proposed Chatham 4 site, that's pointing right down that section.

If you look at the antennas that are focused on Chatham 4, the one at 320 degrees would help Madison and Chatham and that one pointing 50 degrees would help the Florham Park. And the 700 is going to be bigger so it would be able to take off a little bit more and provide some more overlap and some offload than you would at the higher frequencies.

This one, what we see in this data line is, it starts to shed the data and knock people off or slow things down. When you are trending up, if you look at 17-1 of Florham Park, you can see an upwards trend. That will happen until you hit the capacity of the line and then the site starts doing things to preserve itself so that it can still function and handle whoever is on the site now and

then it will flatten out, just like it has in Chatham. If we were able to add another 700 megahertz channel, it would jump up above this but we can't because the FCC has only given us enough spectrum for one channel and T- Mobile has one and AT&T and then it's done. All the spectrum is taken up.

So what happens is, this is what it looks like when a site is beyond its capacity and it's shedding people and it's not going to go any higher than that because it can't. It's not going to. So it is already exhausted; it's been since 2014. We need to do something about it. We are trying to build this site and the Chatham 3 site in order to remedy this.

That's about it. So this puts the time element into the project. Getting on a PSE&G tower is a very lengthy process. They are very thorough; I guess you would say. It takes 18 months to two years to work all that out, get everything established. They go through everything and dot every "I" and cross every "T." So this takes a long time, the structural analysis, all the different pieces, because they are very, very thorough. So it's taken -- we issued the rings back in 2013/2014

for projects because we knew what was going to happen. Unfortunately, it's taken us that long.

So here we are, in 2016, and we still haven't been able to fix the problem yet and we added extra channels at the higher frequencies and they aren't doing any good because they don't cover where the rest of the people are because they are all in the center of the A-15 exhibit where our proposed site is and where the other future site is. That's where the usage is coming from and that's why the other channels aren't helping.

Q. So, Mr. Pierson, just to summarize, this particular new site would not only address the coverage deficiency but also the capacity deficiency in the area?

A. Yes. If you want to see what happens, you get a little hiccup when you add -- the latest one to go on is the 1900 LTE carrier. If you look at, the 17-3 exhibit, when you get to halfway between January 2015 and July 1, 2015, there is a drop in the usage and it comes right back up to saturation. That is when the channel was added at the higher frequency. So you get a couple of days. It starts to work its way around and then, all the sudden, all the people say "It's working here now so

I don't have to go to WiFi." So it's right back up and continuing on the way it has. When that happens, the only thing you can do is put another site in and divide it in half.

Q. That existing Chatham 1, Sector 1 Alpha is servicing people in the Township of Chatham; is that correct?

A. Yes.

Q. That particular sector, according to your testimony, is unreliable from a capacity standpoint?

A. Correct. At 700 megahertz because that is the one that can cover to the east towards the high school and up the hill because of the higher frequencies, as per Exhibit A-15, are not getting that far.

MR. BORSINGER: I have a question on the future growth rates. Is that based upon any market share of Verizon or what is it? What if AT&T comes in here and, you know, offers us a great deal and everyone switches to AT&T?

MR. PIERSON: Then it would go down. Basically, on average, AT&T has 100 million customers, Verizon has 100 million customers and Sprint and T- Mobile share maybe 80 million. So

it's almost like a one-third and one-third and the other two guys have a third.

MR. BORSINGER: Do you have a growth rate?

MR. PIERSON: There are a lot of pieces into that growth rate. I'm a little on the conservative side. I like to look at the trend of what's happening today. I look at that first and say "Okay. It could go to the higher line." The higher line is going too. So if everything stays the way it is and Verizon keeps the same amount of customers and it stays static and what's been going on for years keeps going on, you are going to have that lower trend line. If Voice Over LTE and --

Younger kids getting cell phones now, my daughter was getting her first cell phone at 14 because she was going away to swim camp. Now, they are getting them at 10. So it's crazy. So there are a lot of things that are happening there. What's the data usage? Video streaming is getting popular. How many more subscribers are you going to add in a year? There's a lot of things that go into that other line.

MR. BORSINGER: If you do a square analysis, it would be flat, right?

MR. PIERSON: Well, the Chatham will be flat because it can't go any higher. It can't handle any more. It's never going to go any higher.

MR. FERRARO: It's currently in exhaust?

MR. PIERSON: Correct. It's not going to handle it. It just sheds it onto 3G or says, "Sorry, try again later" but I see upwards trends on ones that aren't like if you are looking at Florham Park. Madison has a slight upwards trend about the same time we added the channel in Chatham. You see a drop down but it is starting to come up already right after that. So that's -- this, basically, was flat and it's going to keep going up.

MR. HYLAND: There's a blue dot at Chatham and a red dot at Chatham 4, the site we are talking about. If you double the number of users between those two sites, do you have to put in another tower between two of them?

MR. PIERSON: If I can -- I only have 10 megahertz at 700 megahertz LTE channel. It can handle X-amount of usage. The Y axis that says "2,000, 4,000, 6,000" on the side, that's the number of megabits in an hour. So that just gives you an idea. That's forward data volume. That is the

volume that that one sector, of megabits that it can do. So it can do 3,000 or 4,000 in one hour of throughput. So that's on a smaller channel.

At the higher frequencies, we have four times capacity. There's four channels there. I can do four up there on the higher frequencies so I can get significantly more throughput out of those out of that spectrum. You would have to more than double the population because I have four times capacity if I can get coverage at those frequencies.

MR. HYLAND: So either doubling the population or usage per person means you will be back so many years from now to put in another?

MR. PIERSON: A little more than double unless it's 10 years or 15 years. I don't have -- my crystal ball is broken that far out.

MR. HYLAND: What about the compression algorithms; will they get less?

MR. PIERSON: The LTE standard is what it is. There are other standards that are coming out but they look like -- it's 5G. So we have 4G now. They are working on 5G. That can handle a gigabit per second but you need so much frequency to do that. It's not going to happen in cellular bands. Like here, they provide coverage in suburban

areas. That's going to be in the City, Jacob Javits Center or stadiums and such, real dense populations where that's going to be required because it's not going to go more than a couple hundred feet. It's going on a Chatham Downtown site from a coverage perspective. So the next one is already being tested by various carriers, AT&T, Verizon and everybody, but it needs so much spectrum, it won't fit in the FCC-licensed bands that we have here. I'm not sure how much that's going to do for the mobile wireless in a suburban-area situation. I think it's more key to where you have a significant density of people, New York City, etc.

CHAIRMAN VIVONA: Anybody else?

(No response)

FURTHER DIRECT EXAMINATION BY MR. FERRARO:

Q. Mr. Pierson, the facility, if approved, will it cause any interference with any existing wireless telecommunications or municipal communications in the area?

A. We don't expect any type of interference. Verizon has their own FCC-licensed band. It's not shared like baby monitors or cordless phones. We are bound by an FCC license and if something happens and we are creating

interference, we have to take responsibility for it or turn off.

Q. This facility would be monitored 24/7?

A. Yes. There's an operations center. They will know if a door opens on a cabinet, if the power goes out, if any of 50 to 100 things happens on the site with the sensors. They would dispatch a technician. They can control it and turn it on and off remotely as well. The technician has a Ford Explorer type vehicle when checking the equipment.

Q. Okay?

MR. FERRARO: No further questions of Mr. Pierson, Mr. Chairman.

DR. EISENSTEIN: I have no questions on this last testimony.

CHAIRMAN VIVONA: At this point, we will open it up for questions from Mr. Pierson's testimony. If you want to make a statement, you will have an opportunity but now is not the time. This is questions about what Mr. Pierson has explained to us.

MS. HERR: Mary Herr, 53 Pine Street.

You mentioned the other towers are in Watchung, Summit municipal building, New Providence and Chatham police station. Are any of those

existing towers within 44 feet of a residence and in a residential area?

MR. PIERSON: I don't know any particular distance to a house.

Just to make a correction, Summit 4 is on municipal property, not the municipal building. If you are familiar, over the railroad tracks, there's a house right across the street. It's 150 feet away.

MS. HERR: Not 44 feet?

MR. PIERSON: Not that one. I wanted to get the frame of where some of it was to make sure. The Florham Park, the house is directly across the street. There's a street --

MS. HERR: That is by the gas station.

MR. PIERSON: No, this is up further. As soon as the trees stop and you look directly to your left, there's a tower.

MS. HERR: But it's not next to a residential home. There's a street between.

MR. PIERSON: Correct. Madison is -- I'm sorry. I was looking at the tower. I'm not sure what is on the other side of the street. It's a property. It's a pole and I would have to check Google Earth to see what is directly around that but

that's pretty dense around that.

MS. HERR: You are saying, most likely, none of those towers are within 44 feet of a residential area. So the decisions you made originally have impacted the choices of where the towers would be placed, the choices you made originally so...

My other question is: It sounds like you are looking for those prime spots that are going to create the optimum options for Verizon and I understand that but I also want to know how this is going to benefit -- and I'm a neighborly person -- Florham Park, Madison, but also at the detriment of somebody living in an area that is in very, very close proximity to this. I'm all about being neighborly but you hear a lot of how it's going to benefit outside areas.

Just another question that I'm considering and for somebody that works in the district and in the schools quite a lot, I think -- has the district been approved or contacted about how they propose would be the best solution for what you deem their wireless concern?

MR. PIERSON: I think that's why we are here.

MS. HERR: Has the school district been consulted that this is a concern for them, the wireless service?

MR. PIERSON: I wouldn't have any interaction with the school.

CHAIRMAN VIVONA: We put out a public notice. It's impossible to contact everybody.

MS. HERR: I keep hearing "the high school, the high school, the high school." As somebody who works the district, I don't hear that concern.

MR. PIERSON: When you are talking about benefit, the one thing we don't have on the larger exhibit is the yellow tint on A-13 and A-14 is Chatham Township. So if you look at A-14, you see what we are providing service to. Most of it is covering Chatham. There's a little bit that's going into the Madison area. There's a little bit going into Florham Park. When we say that you are benefiting those areas, that means those sites are trying to cover into Chatham Township right now and what we are doing is, instead of them trying to reach too far, we are trying to put this in here so we cover Chatham and we take care of the situation that's near our site. These other sites are trying

to serve all the residents that are near Shunpike and Pine Street but they are having a lot of trouble with that. That's just an idea of where everything is laid out and put into perspective.

MS. HERR: I would ask the Board to take a critical eye to the data to meet their needs.

CHAIRMAN VIVONA: This is just the first day. We try to take care of everything. Thank you.

MS. MILAZZO: Cynthia Milazzo, 26 Pine Street.

How many customers are in that range currently for Verizon?

MR. PIERSON: I don't know the customer count. If we take an average, if the population data from 2010 is correct at 3400 for that whole section, that's people, and if we have a third, you are looking at 1,000-something.

MS. MILAZZO: That third most busiest hour, how representative is that in a 24-hour frame? So it's your third most busiest, that third. Does that account for a third of the day? I guess, how does that...

MR. PIERSON: The way the traffic runs from a 24-hour period, it will start to ramp up in

the mornings, morning commutes and things and evening is checking e-mails and my daughter is checking her Snapchats at 7:30 in the morning, it will keep a slight rise until noon. It usually keeps a pretty consistent usage from around midday to 7:00, 8:00 at night and then it will dip down a little bit in the further evening hour and then drop off significantly. It depends on the area. Some areas are up to 11:00 and some are shut down at 7:00 but in a suburban area, you are going to have a fair amount of usage into the early evening and have nothing and it will hop up again in the morning. That third busiest hour is going to be a pretty good approximate of the 3:00-to-7:00 time frame.

MS. MILAZZO: Four hours of a 24-hour period?

MR. PIERSON: Yes. It depends on what is going on in that area.

MS. MILAZZO: Is the need of the coverage -- I don't know the FCC requirements for it. But is the need for ubiquitous coverage the need for these towers or is it another financial need?

MR. PIERSON: There are certain standards between the FCC and acts and things like

that. I guess the government is a much higher entity than I and everybody says it's very important to have wireless communication and another method of communication besides landline phones and, etc., so that, when there's failures, you have options. So Verizon is just trying to keep up with their consumers at this point. You see the data usage. So we are trying to keep up with the demand of our consumers at this point. We have to spend a lot of money to do that. If there's no more customers here, we don't get any more revenue because they are there and they are there tomorrow. If we don't do that, they go somewhere else.

MS. MILAZZO: So the need is not necessarily to keep the coverage ubiquitous to meet an FCC need but maybe for another reason?

MR. PIERSON: There's different kinds of gaps. We have an FCC license at a given frequency. So the government auctions these off for one billion dollars. With that, you have the right to build a system on that particular frequency and cover everything with it. So it's the whole business thing with the government. So Verizon has the right to build out that particular frequency. We have the right to build out those frequencies and

provide a network that is substantially better than mediocre to provide this because somebody higher than us decided it's a good idea. We are going along with that trend and that's where Verizon fits in in order to provide that service but somebody already decided this is a good idea and given our sole licenses to implement that idea.

MS. MILAZZO: You are not covering the whole nation to this degree. You are not going to provide this level of service to 100 percent of your customers 100 percent of time.

MR. PIERSON: This is a case with the federal court that I testified in in '93 in Ho-Ho-Kus and what came out of that is that you are not going to cover every cul-de-sac. You need to be somewhat significant from a federal standpoint. So from my standpoint, when I look at -- some things I look at is: Is it significant? Is there a lot of people? I can't build a site because I'm going to cover a cul-de-sac. We have a lot of usage here. We have a lot of people traveling and high schools and -- this is New Jersey. It's very, very dense. You are going to have this type of coverage items and this level of coverage in a state like New Jersey, especially in the eastern portion. If you

go out to Hunterdon County, it's going to be a different design. The level is the same. It's still suburban; they still have houses but the design may be different because the density is not there. They aren't going to have a capacity issue if you go out west so you are going to have something that may be a little different. We are still trying to provide what we are supposed to provide based upon getting the FCC license.

MS. MILAZZO: You don't have a map that shows the other tower for the other carriers and the coverage level that they provide and, therefore, the option for other people within the township who may not be getting the greatest service with Verizon but can go to AT&T.

MR. PIERSON: Each person that has a license, they have the right, ability or obligation or some other legal jargon, to do something with the license. If only one carrier did it and they had an outage, everybody is out. You can't go to your neighbor and borrow the phone and then AT&T couldn't handle all the usage because, right now, we are dividing it up and having trouble with it.

I designed New Jersey three times for three different carriers. Everyone is at the

Madison 2 tower. There's, at least, four on that. There are carriers on -- T-Mobile is going back onto a tower, not this one but up the line. They were there; now, they are going back on it. Sprint is up closer to 124 by the gas station that she had mentioned before. Chatham, there are several carriers on that. I don't remember how many. I could probably write it down. New Providence, everybody picks a different pole because you cannot get multiples.

MS. MILAZZO: Is everyone vying for this area?

MR. PIERSON: AT&T is. They had a site here in 2006 and they had to put a temporary site and now they are going back on. Their coverage dropped significantly with that site and they are ready to come back. T-Mobile is on the power line, this same line as it comes up to Fair Lawn Avenue. T-Mobile has coverage coming in from here.

MS. MILAZZO: Is this a gap for everyone in this area?

MR. PIERSON: Today, yes. Because AT&T is on a temporary site on the church in the woods. So they are going to have significantly reduced coverage once they go on their tower. They

are going to have similar to what we are looking at here a little less because of the ground elevation and, etc. Then they will be comparable. T-Mobile is going down by the pool so they are still going to have a problem by Shunpike because, from the pool, you cannot get up over the hill. So they will have less coverage. AT&T, if this was approved, they would be similar. Sprint is going to have problems because they do not have anything in that particular area that I'm aware of and T-Mobile will have half the puzzle.

MR. FERRARO: This information that Mr. Pierson is providing is anecdotal in nature. The Board can't make a decision that, because AT&T or T-Mobile or Sprint has coverage in the area, that Verizon cannot come into this area and serve its customers as well. The FCC is clear on that, that each carrier has to provide ubiquitous service based upon the frequencies that were licensed.

MR. PIERSON: I would like to know where they are because I would rather collocate, if possible.

CHAIRMAN VIVONA: Okay.

We are running out of time. Is there any more questions?

MR. HERR: Robert Herr, 53 Pine Street.

Thank you for taking two and a half hours and taking questions. I appreciate your time. I have a few questions. You have to bear with me.

You talked about gaps and capacity and gaps in coverage. Is there an industry definition that all carriers define what a gap is and, if so, who sets that definition and who regulates whether or not a gap exists?

MR. PIERSON: A gap in coverage, I fall back on the Upper Saddle River case where it established what a reasonable signal strength is for a suburban area. So this is data; that was a voice. So we actually -- the levels are a different number but it relates to the same thing. If you do all the math and normalize everything, suburban coverage, that was established in the Upper Saddle River case. That's where I see -- there is industry standard. There's link budgets and there's proprietary calculations that each carrier does with what equipment they are using that defines all the design criteria. They all pretty much show up to the same degree with the Upper Saddle River. So that would be that standard.

Capacity is: Are you exceeding what you have or are you not? So that is pretty cut and dry.

MR. HERR: I understand the FCC or federal law is there. The current coverage in this area at least meeting the minimum required by law, either through Homeland Security or anything political, FCC is what is currently being provided meeting the minimums required under federal law?

MR. PIERSON: From a lower frequency standpoint, you are probably getting pretty close to that from the existing sites because that travels further but then we have the capacity issue, which means now, we are not ubiquitous because, if you cannot access the network, that is where that applies.

From the higher frequencies, we are not providing a mediocre signal so the site density is enough to do that. So it depends on which frequency band and which license you look at. Different pieces apply so that is why we broke it into the two different pieces and --

MR. HERR: So the answer to my question is yes or no, either we are or not?

MR. PIERSON: Certain frequencies, we

are not. That's the higher.

MR. FERRARO: That's what we are here for, correct?

MR. PIERSON: Correct.

MR. HERR: Just to be clear, we are not providing coverage. We are talking about improving coverage, correct?

MR. PIERSON: We are providing coverage at particular licenses for 1900 and 2100. We are providing service at the lower frequencies but we have a license for each and we are supposed to do something with them. We can't just sit on it.

MS. HERR: Are those frequencies on the other towers?

MR. PIERSON: Yes. All of them.

MS. HERR: And they can be on the AT&T towers? That's what we are hoping that you are looking into, possibly doing the other AT&T and seeing if you would collocate those on other towers.

MR. PIERSON: Whatever site that we go on, we would be putting both the high and low frequencies.

MR. HERR: Thank you.

MR. FERRARO: Thank you.

MISS HERR: Ellie Herr, 53 Pine

Street.

What is the total area of the cell tower? What's the total area of ground it's going to cover?

MR. PIERSON: That's another guy that talks about the ground and the dimensions and he will be here next time. He's here tonight but we are not going to make it to him.

DR. EISENSTEIN: A square mile.

MR. FERRARO: I think she's referring to the area of the equipment cabinet. It's, roughly, 19 and a half feet wide by 27 feet wide. It might change based on the design but our engineer will confirm that next time. So approximately 19 and a half feet wide by 27 feet long, that would be the fenced area.

MR. MICHAELS: The 3,472 people that you said that you are going to serve, does that include an area that's greater than just the portion of Chatham? Does that include the other sounding municipalities?

MR. PIERSON: It includes everything on the second overlay that shows the proposed coverage.

MR. MICHAELS: You had some kind of a

methodology to identify the population in that coverage area?

MR. PIERSON: This is all in a mapping GIS table. I have a table that comes from the census. You turn that on and I can have it select all the dots that are inside the coverage contour and it sums them up.

MR. MICHAELS: That's why it is that population, because it's part of Chatham and portions of other communities.

MR. PIERSON: Yes.

CHAIRMAN VIVONA: If there's nothing else for Mr. Pierson, we can adjourn this part of the meeting for this period.

MR. SHAW: Well, relative to rescheduling this, we have T-Mobile in March and those involve towers that are in a temporary location that the DEP said we have to be off by July. We are kind of -- you got started first but they are currently located on a temporary tower that is going to have to be moved by July 1st. Our next meeting would be April 13th and we would give you the full evening for that.

MR. FERRARO: Thank you for working with us. We understand that you have a packed

agenda.

MR. SHAW: With cellular. So for the members that are here, this application is going to be carried to the Board's meeting on April 13th without any further notice.

MR. FERRARO: We will extend the statutory time period up until that time.

(The hearing is adjourned at 10:50 p.m.)

C E R T I F I C A T E

I, ALISON GULINO, a Certified Court Reporter, Registered Professional Reporter and Notary Public of the State of New Jersey, do hereby state that the foregoing is a true and accurate verbatim transcript of my stenographic notes of the within proceedings, to the best of my ability.

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